

REMARKS

Claims 1, 3-8 and 10-20 are pending in this application. Claims 1 and 8 are independent.

Claims 1, 3-8 and 10-20 are presented for further prosecution on the merits.

A. Introduction

In the outstanding Office action:

1. claims 1, 8 and 12-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Publication No. 2004/0217932 to Nally et al. ("the Nally et al. reference") in view of U.S. Patent No. 7,030,848 to Sato et al. ("the Sato et al. reference");
2. claims 3-5, 7 and 10-11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Nally et al. reference in view of the Sato et al. reference and further in view of U.S. Patent No. 5,841,492 to Iwauchi et al. ("the Iwauchi et al. reference"); and
3. claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the Nally et al. reference in view of the Sato et al. reference in view of the Iwauchi et al. reference, and further in view of U.S. Patent No. 5,131,736 to Alvarez ("the Alvarez reference").

B. Asserted Obviousness Rejection of Claims 1, 8, and 12-20

In the outstanding Office action, claims 1, 8, and 12-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Nally et al. reference in view of the Sato et al. reference. Applicants respectfully submit that no *prima facie* case of obviousness has been established, and traverse this rejection for at least the reasons set forth below.

1. The Nally et al. and Sato et al. references fail to teach or suggest every claim element

Independent claim 1 recites, *inter alia*,

... a first non-display period including a white light display period and a first no-light display period during which the driver drives the LCD panel to display white light during the white light display period and then no light during the first no-light display period at a different and distinct time period *after* the white light display period of the first non-display period . . .

(*Emphasis added*).

Claim 8 recites similar language to claim 1, and thus both independent claims 1 and 8 recite that the no-light display period is *after* the white light display period. Neither of the applied references, however, teaches, or even suggests, this subject matter. Indeed, applicants respectfully submit that the modifications to the teachings the prior art that are asserted in the Office action are contrary to the teachings of the references themselves.

In particular, the Nally et al. and Sato et al. references *both* teach away from putting a black period after a white period. The Office action asserts, “Nally, as modified by Sato, discloses that the no-light period occurs after the white light display period.”¹ In this regard, the previous Advisory Action, mailed September 21, 2007, also asserted, “Nally does not require that the black periods occur before the white period.”² However, applicants respectfully submit that these characterizations of the applied references are inaccurate.

The Nally et al. reference states that the white time period is employed “in order to drive the pixel to a color state after the black periods.”³ Thus, the white period serves to counter the effects of the black period, and, contrary the argument advanced in the Advisory Action, one of ordinary skill in the art would not be motivated to place the white period before the black period. Further, the Sato et al. reference also teaches that a white period should follow a black period in order to reduce the time required for the liquid crystal to respond.⁴

In view of the above, applicants respectfully submit that the Nally et al. and Sato et al. references both teach away from placing the white period before the black period. Therefore, one of ordinary skill in the art would not be motivated to modify the references in the manner

¹ Office action mailed October 31, 2007, paragraph no. 5, page 4.

² Advisory Action mailed September 21, 2007, continuation sheet.

³ The Nally et al. reference, paragraph [0027].

⁴ See the Sato et al. reference at col. 17, lines 17-50, which describes a 1st non-video signal (a black display voltage) followed by a 2nd non-video signal (a white display voltage), and states, *inter alia*, “the 2nd non-video signal voltage serves to reduce the response period of the liquid crystal.”

asserted in the Office action and in the previous Advisory Action. Rather, applicants respectfully submit that the modifications to the prior art proposed in the Office action are the product of hindsight reconstruction based solely on applicants' own disclosure.

2. One of Ordinary Skill in the Art Would Not be Motivated to Combine the Nally et al. and Sato et al. References

a. The asserted combination of references would be unworkable

In addition to the above, applicants respectfully submit that the proposed combination of references would be unworkable. The LCD display taught by the Nally et al. reference is a normally-black mode LCD.⁵ A normally-black mode LCD has a physical structure that requires the application of a high level signal in order to place the liquid crystal cells in the transmissive state required to display a desired color. In contrast, waveforms described in the Sato et al. reference are designed for a normally-white mode LCD. Thus, the waveforms will be *low* at the time color is to be displayed. Accordingly, an attempt to apply a normally-white mode driving waveform to an LCD having a normally-black structure would result in the liquid crystal cells of the LCD receiving no signal or only low level signals when color should be displayed.⁶ As a result, rather than effecting a display of color, the normally-white

⁵ This is evident from FIG. 7 of the Nally et al. reference, which shows a "black" state when the signals V_{COLUMN} and V_{LC} are low. Further, the Office action admits that the Nally et al. reference is directed to a normally-black mode LCD. *See the Office action mailed October 31, 2007, at paragraph no. 5, page 2.*

⁶ In this regard, applicants note that the Office action glosses over inconsistencies in the proposed modification of the prior art, and mischaracterizes how an LCD panel would operate if modified by combining the Nally et al. and Sato et al. references. In particular, in connection with claim 16, the Office action states,

To further explain, Nally's original waveform is **black | white | color | hold | repeat**. Sato's normally white display and second non-display period is black | color | black | repeat. Upon combination the Nally waveform becomes, **white | black | color | black | repeat**.

(*Office action at page 7 (emphasis added)*).

Thus, the Office action asserts that driving the normally-black mode display taught by the Nally et al. reference as a normally white mode display (as taught by the Sato et al. reference), would invert black for white and white for black. The Office action further asserts that the color period *would not* be inverted, while asserting that the color hold period *would* be inverted. This is clearly inconsistent and inaccurate.

First, the Office action asserts that inversion of the color hold period would result in black (the fourth period of the combined waveform), yet inconsistently asserts that inversion of the color period would result in color. One of ordinary skill in the art would not expect such inconsistent operation to occur. Further,

mode driving waveform would place the normally-black mode LCD in a non-transmissive state. Therefore, applicants respectfully submit that one of ordinary skill in the art would not be motivated to combine the Nally et al. and Sato et al. references in the manner advanced in the Office action.

b. The asserted modifications are improper under *In re Ratti*

It is well established that a combination of references that would require a substantial reconstruction and redesign of the elements shown the prior art, as well as a change in the basic principles under which the prior art was designed to operate, is not a proper ground for an obviousness rejection.⁷ The asserted rejection, however, relies on a combination of the normally-black mode LCD taught by the Nally et al. reference with the waveforms taught by the Sato et al. reference, which are designed for a normally-white mode LCD. Such modification would alter the basic principles of operation of the applied references, and would require the applied references to be completely reconstructed and redesigned. For example, as discussed above, the normally-black mode LCD would not display color when waveforms for a normally-white mode LCD are applied thereto. Further, the Nally et al. reference makes clear that changes that are far less significant than those proposed in the Office action, changes as minor as, e.g., merely re-sizing a liquid crystal cell, will result in the need to make significant changes to the display, such as making changes to accommodate changes in current flow and cell capacitance.⁸

even assuming, *arguendo*, that color might be generated by an inverted signal (i.e., the third period of the combined waveform), one of ordinary skill in the art would appreciate that such color would *not* correspond to the desired image signal, and thus the display would be rendered inoperable for its intended purpose.

⁷ *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

⁸ See the Nally et al. reference at, e.g., paragraph [0029].

c. The Sato et al. reference, when considered as a whole, would lead away from the claimed subject matter

It is also well established that a prior art reference must be considered as a whole, including portions that would lead away from the claimed invention.⁹ The Office action, however, fails to satisfy this requirement in ignoring aspects of the Sato et al. reference that would lead one of ordinary skill in the art away from the subject matter recited in the rejected claims.

For example, in the Sato et al. reference, color images are displayed using the field sequential color method, in which red, green and blue light are separately displayed in three respective sub-fields to obtain a desired color.¹⁰ In contrast, the claimed display produces a desired color by adjusting the gray level of red, green and blue light while the red, green and blue light are *concurrently* displayed during the period t_c . Moreover, the Sato et al. reference teaches that one frame has *three* sub-frames, and *each* of the three sub-frames includes the periods T_a , T_b , T_h , T_{c1} and T_{c2} .¹¹ In contrast, the claimed display does not use sub-frames. Instead, in the claimed display, a frame includes one sequence of the periods t_w , t_{off} , t_c and t_{off} .

Further, the Sato et al. reference uses an entirely different way of driving a frame, because the period T_a in the Sato et al. reference is a video signal white period and T_b is a liquid crystal response period, each of T_a and T_b being repeated three times per frame. In contrast, in the claimed display, the first non-display period includes the period t_w , which is a white display period, and the period t_{off} , in which none of the colors of light are displayed, each of which are included in a sequence that is provided only once per frame. Accordingly,

⁹ *W.L. Gore & Assoc., Inc., v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

¹⁰ See the Sato et al. reference at, e.g., FIG. 11D.

¹¹ *Id.*

applicants respectfully submit that, taken as a whole, the Sato et al. reference would lead away from the claimed subject matter. Therefore, the Sato et al. reference fails to even remotely suggest the claimed subject matter.

In view of the above, applicants respectfully submit that the asserted obviousness rejection is improper because the references themselves teach away from the combination asserted in the Office action. Further, the proposed modifications to the prior art would be unworkable, would require a substantial reconstruction and redesign of the elements shown the prior art, and would change the basic principle of operation of the references. Finally, even if such a combination was proper and workable, it would still fail to suggest providing a black period after a white period, because the references themselves teach just the opposite. Accordingly, applicants respectfully submit that the Office action fails to set forth a *prima facie* case of obviousness. Therefore, applicants respectfully request that this rejection be favorably reconsidered and withdrawn.

C. Asserted Obviousness Rejection of Claims 3-5, 7, 10 and 11

In the outstanding Office action, claims 3-5, 7, 10 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Nally et al. and Sato et al. references, and further in view of the Iwauchi et al. reference. Applicants respectfully traverse this rejection. Claims 3-5, 7, 10, and 11 ultimately depend from claims 1 and 8, which are allowable over the Nally et al. and Sato et al. references for the reasons set forth above. Applicants respectfully submit that the Iwauchi et al. reference fails to cure the deficiencies noted above with respect to the Nally et al. and Sato et al. references. Therefore, applicants respectfully request that this rejection be favorably reconsidered and withdrawn.

D. Asserted Obviousness Rejection of Claim 6

In the outstanding Office action, claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the Nally et al., Sato et al., and Iwauchi et al. references, and further

in view of the Alvarez reference. Applicants respectfully traverse this rejection. Claim 6 ultimately depends from claim 1, which is allowable over the Nally et al., Sato et al., and Iwauchi et al. references for the reasons set forth above. Applicants respectfully submit that the Alvarez reference fails to cure the deficiencies noted above with respect to the Nally et al., Sato et al., and Iwauchi et al. references. Therefore, applicants respectfully request that this rejection be favorably reconsidered and withdrawn.

E. Conclusion

The above remarks demonstrate the failings of the outstanding rejections, and are sufficient to overcome them. However, while these remarks may refer to particular claim elements, they are not intended to, nor need they, comprehensively address each and every reason for the patentability of the claimed subject matter over the applied art. Accordingly, applicants respectfully submit that the claims are allowable for reasons including, but not limited to, those set forth above, and patentability of the claims does not depend solely on the particular claim elements discussed above.

If the Examiner believes that additional discussions or information might advance the prosecution of the instant application, the Examiner is invited to contact the undersigned at the telephone number listed below to expedite resolution of any outstanding issues.

In view of the foregoing remarks, reconsideration of this application is earnestly solicited, and an early and favorable further action upon all the claims is hereby requested.

Respectfully submitted,

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